

**Navigation Improvement Study of  
the  
Upper Mississippi River Near  
Savanna Bay, Pool 13**

**Sedimentation and Hydrodynamic  
Investigation**

**Volume 2 of 2**

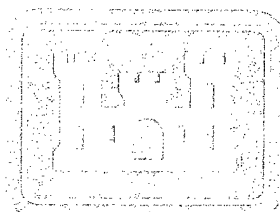
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**US Army Corps  
of Engineers**

ILLINOIS  
Carroll County

2 298 000 E

Savanna Bay

2 296 000 E

Mississippi Palisades State Park

Sweeney  
Islands

Island 266

Boy Scout Island

IOWA  
Jackson County

Dike 539.2R

Sabula Slough

1 990 000 N

EL: 10  
EL: 0  
EL: -10  
EL: -20  
EL: -30

ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL



U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS

PREPARED BY: C. MATHEWS  
DRAWN BY: C. MATHEWS  
CHECKED BY: R. DAVENPORT

SAVANNA BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
1996 PROTOTYPE SURVEY

800 400 0 800 FT

GRAPHIC SCALE: 1" = 800'

DATE: 06/96

20

ILLINOIS

Carroll County

Savanna Bay

Island 266

Sweeney Islands

Dike 539.2R

Sabula Slough

Santa Fe Island

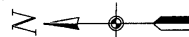
Riprap Island

Dike 540.9R

Dike 540.8R

Dike 540.7R

IOWA  
Jackson County



ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

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SAVANNA BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 542-537

BASE TEST

800 400 0 800 FT

GRAPHIC SCALE: 1" = 800' PLOT DATE: MAY 91

PLATE NO.

21

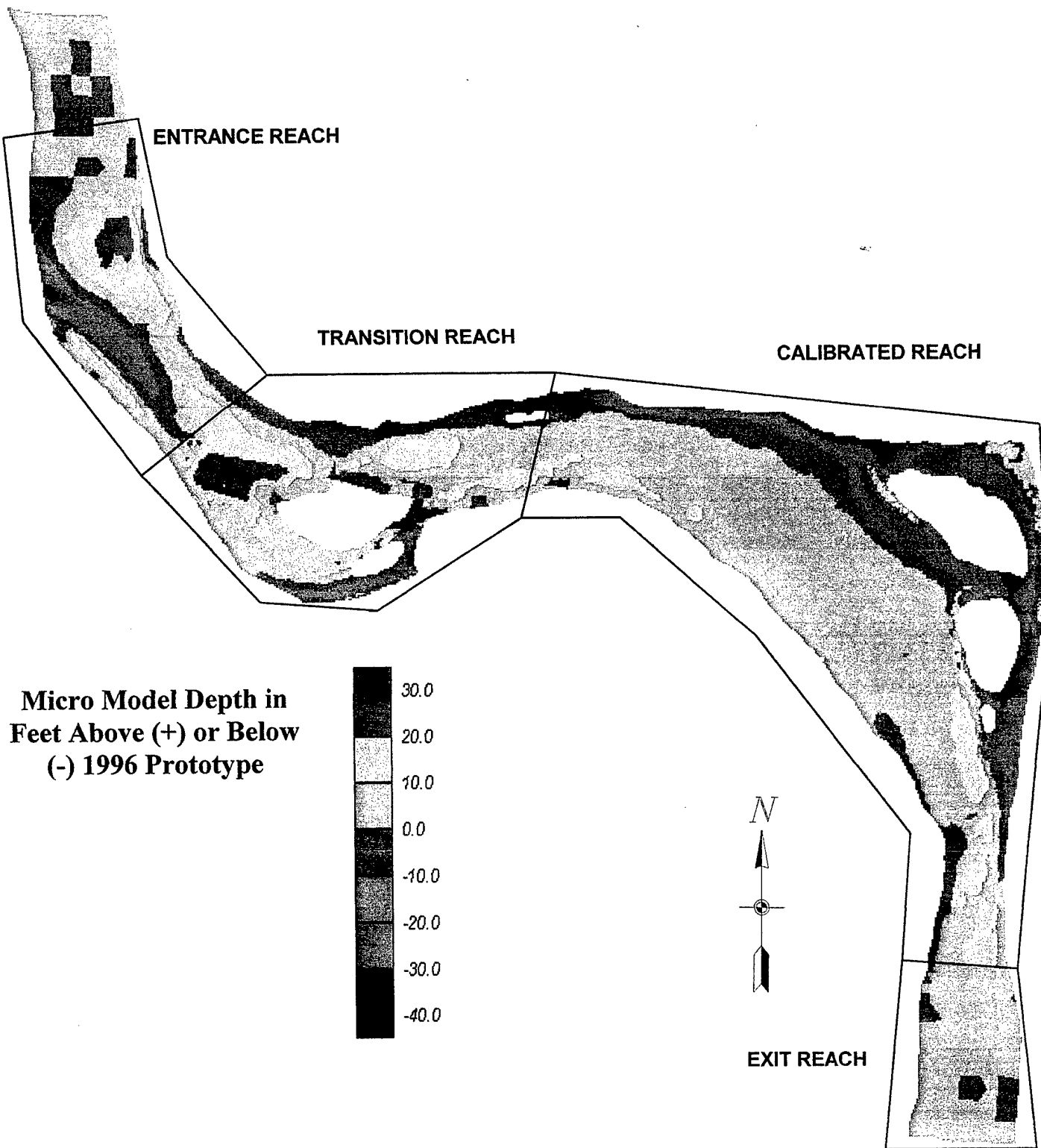


PREPARED BY: C. MATHES  
DRAWN BY: C. MATHES  
BY: R. DAVENPORT

1 988 000 N

1 986 000 N

1 984 000 N



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PREPARED BY: T. Wikeong  
CHECKED BY: R. Devivoy

**Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13**

Comparison of Prototype Bathymetry Versus  
Micro Model Bathymetry

PLATE NO.

**22**

Sweeney Islands

Island 266

SWEENEY ISLAND

Island 266

Sabula Slough



EL. 10  
EL. 0  
EL. -10  
EL. -20  
EL. -30



PREPARED BY: C. MATHEWS  
DRAWN BY: C. MATHEWS  
CHECKED BY: R. DAVENPORT

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SAVANNAH BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538

BASE TEST

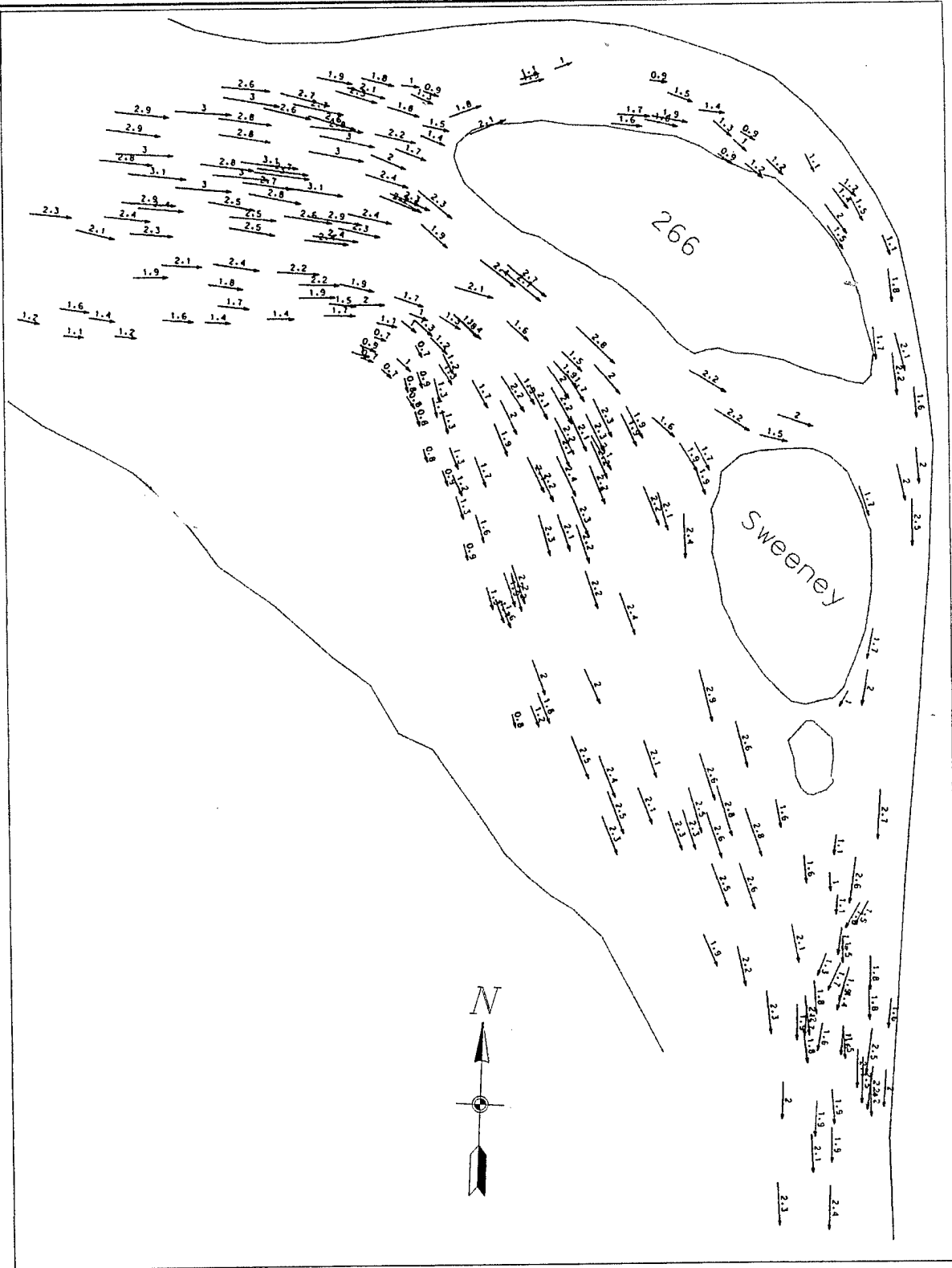
800 400 0 800 FT

ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

DESIGN: LAC, SAVANNAH BAY  
PLOT DATE: NOV 57

PLATE NO

23



PREPARED BY: C. Mathes  
CHECKED BY: R. Davenport

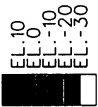
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**Navigation Improvement Study of the Upper Mississippi  
River Near Savannah Bay, Pool 13**

**Base Test  
Micro Model Flow Visualization Velocity Diagram**

PLATE NO.

**24**

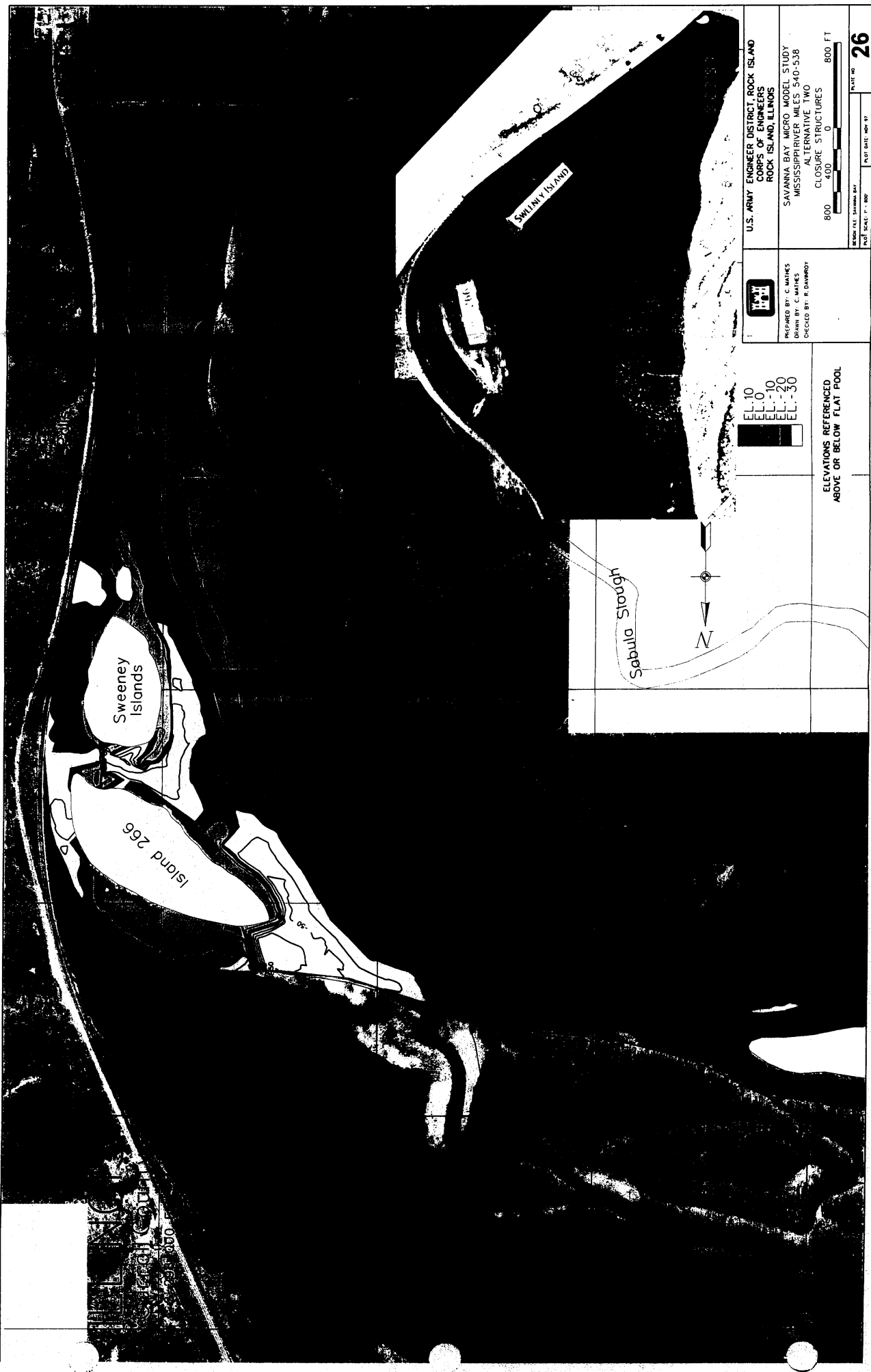



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ROCK ISLAND, ILLINOIS


SAVANNA BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE ONE  
CLOSURE STRUCTURES

800  
400  
0  
800 FT

DESIGN FILE: SAVANNA BAY  
PLOT DATE: MAY 91  
PLOT SCALE: 1" = 800'  
PLATE NO. 25



	U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS
	SAVANNAH BAY MICRO MODEL STUDY MISSISSIPPI RIVER MILES 540-538 CLOSURE STRUCTURES ALTERNATIVE TWO
800 400 0 800 FT	
REGION 14C, SAVANNAH BAY PLOT SCALE: 1" = 800' PLOT DATE: NOV 97 PLATE NO. 26	

 10 0 -10 -20 -30	ELEVATIONS REFERENCED ABOVE OR BELOW FLAT POOL
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Sabula Slough

U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS	
SAVANNAH BAY MICRO MODEL STUDY MISSISSIPPI RIVER MILES 540-538 ALTERNATIVE THREE OPTION ONE WITH WINGDAMS 800 FT	
DESIGNED BY: SAVANNAH BAY PROJECT SCALE: 1" = 800'	PLATE NO. <b>27</b>

ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL



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 ROCK ISLAND, ILLINOIS

SAVANNA BAY MICRO MODEL STUDY  
 MISSISSIPPI RIVER MILES 540-538  
 ALTERNATIVE FOUR  
 OPTION TWO WITH WINGDAIS

800 400 0 800 FT

DESIGN FILE: SAVANNA BAY  
 PLOT SCALE: 1" = 800'

PLATE NO. **28**

PREPARED BY: C. MAYES  
 DRAWN BY: C. MAYES  
 CHECKED BY: R. DAVENPORT

ELEVATIONS REFERENCED  
 ABOVE OR BELOW FLAT POOL

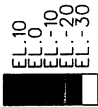
EL. 10  
 EL. 0  
 EL. -20  
 EL. -50



EL: 10  
EL: 0  
EL: -10  
EL: -20  
EL: -30

ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND  
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ROCK ISLAND, ILLINOIS  
SAVANNAH BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE FIVE  
WINGDAMS  
800 400 0 800 FT  
DESIGN FILE SAVANNAH BAY  
PLOT SCALE 1" = 800'  
PLOT DATE NOV 97  
PLATE NO. 29



PREPARED BY: C. MATHES  
DRAWN BY: C. MATHES  
CHECKED BY: R. DAVENPORT

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SAVANNAH BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE SIX  
REVETMENT CONNECTOR  
800 400 0 800 FT

DESIGN FILE: SAVANNAH BAY  
PROJECT SCALE: 1" = 800'  
PLATE NO. 30



ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

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PREPARED BY: C. MATHEWS  
DRAWN BY: C. MATHEWS  
CHECKED BY: R. DANNERT

SAVANNAH BAY, MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE SEVEN  
STUB DIKE OFF REVELMENT

800 400 0 800 FT

GRAPHIC SCALE 1" = 800' PLOT DATE: NOV 97 PLOT NO: 31





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SAVANNAH BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE NINE  
THREE CLOSURE STRUCTURES

800 400 0 800 FT

DESIGN FILE SAVANNAH BAY  
PROJECT SCALE 1" = 800'  
PLATE NO. 33

PREPARED BY: C. MATHES  
DRAWN BY: C. MATHES  
CHECKED BY: R. DAWBNEY

ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL



ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL



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PREPARED BY: C. MATHES  
DRAWN BY: C. MATHES  
CHECKED BY: R. DAWGRO

SAVANNAH BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE TEN  
SECOND CLOSURE FORWARD



DESIGN DATE: SAVANNAH BAY  
PLANT SCALE: 1" = 800'  
PLANT NO.: 34





EL. 10  
EL. 0  
EL. -10  
EL. -20  
EL. -30



Sabula Slough

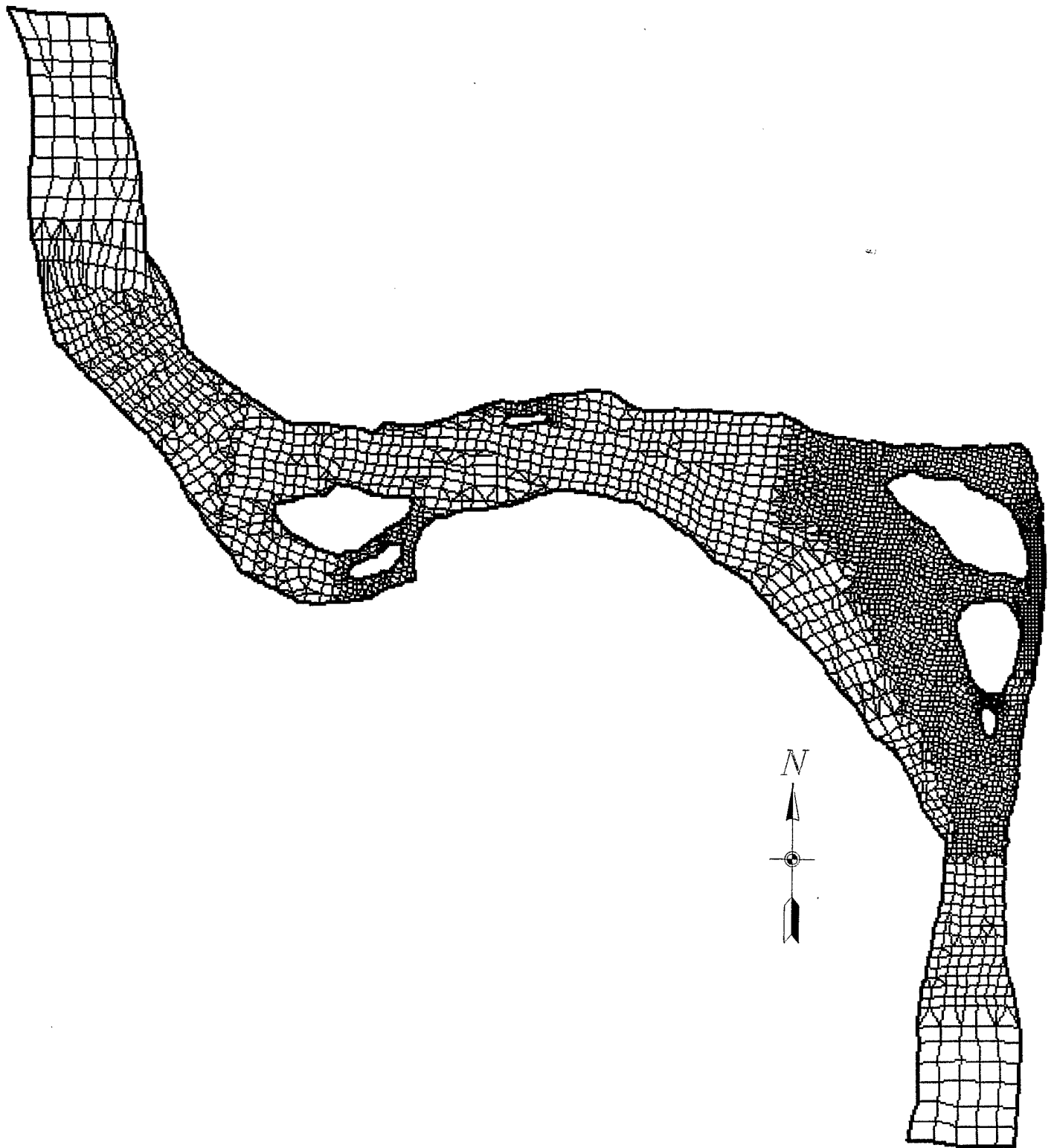
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PREPARED BY: C. JAMES  
DRAWN BY: JAMES  
CHECKED BY: R. DAWSON

SAVANNA BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE ELEVEN  
CLOSURE STRUCTURES LOWERED  
800 400 0 800 FT

ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

DESIGN FILE: SAVANNA BAY  
PLOT SCALE: 1" = 800'  
PLOT DATE: NOV 81  
PLATE NO: 35



PREPARED BY: T. Kirkseong  
CHECKED BY: R. Daveroy

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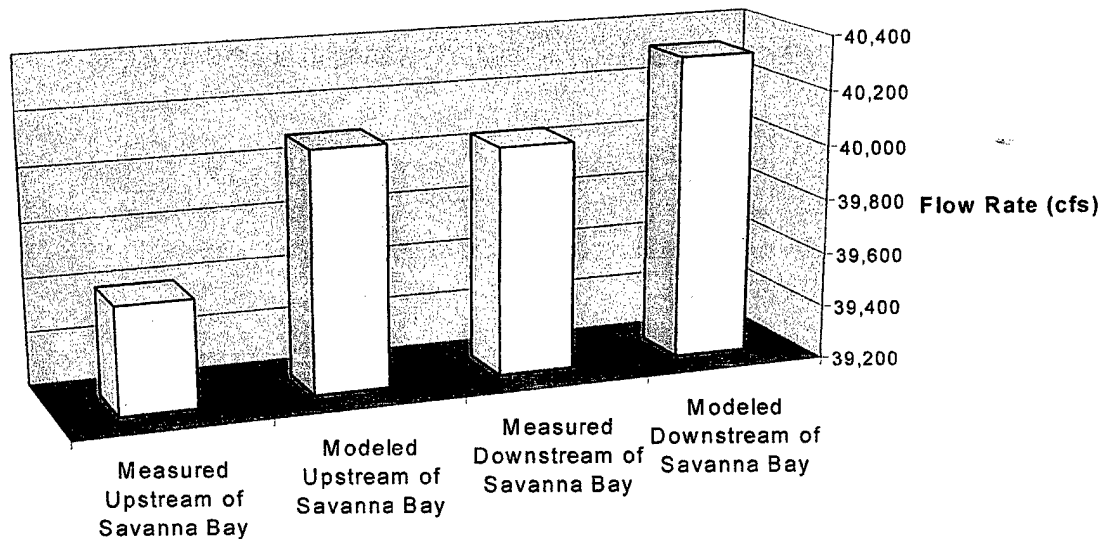
Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Finite Element Grid,  
SMS Model

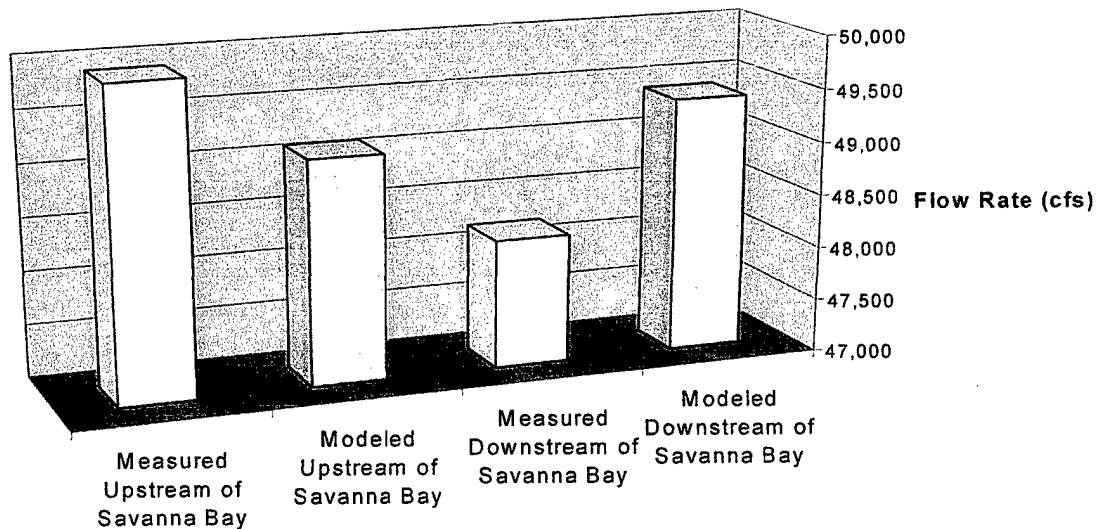
PLATE NO.

**36**

**Main Channel**  
**Savanna Bay Flow Measurements vs. SMS Modeling Results**  
 Mississippi River, 40,000 cfs



**Main Channel**  
**Savanna Bay Flow Measurements vs. SMS Modeling Results**  
 Mississippi River, 49,000 cfs



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PREPARED BY: T. Kirkong  
 CHECKED BY: R. Dawkay

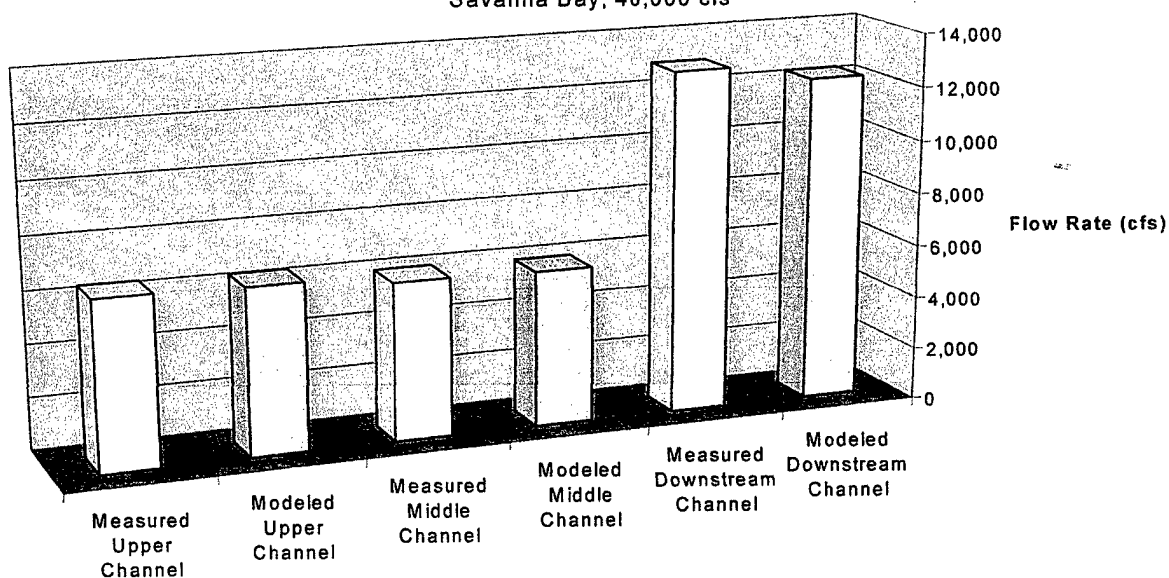
Navigation Improvement Study of the Upper Mississippi  
 River Near Savanna Bay, Pool 13

Main Channel  
Measured Flow vs. SMS Modeling Results

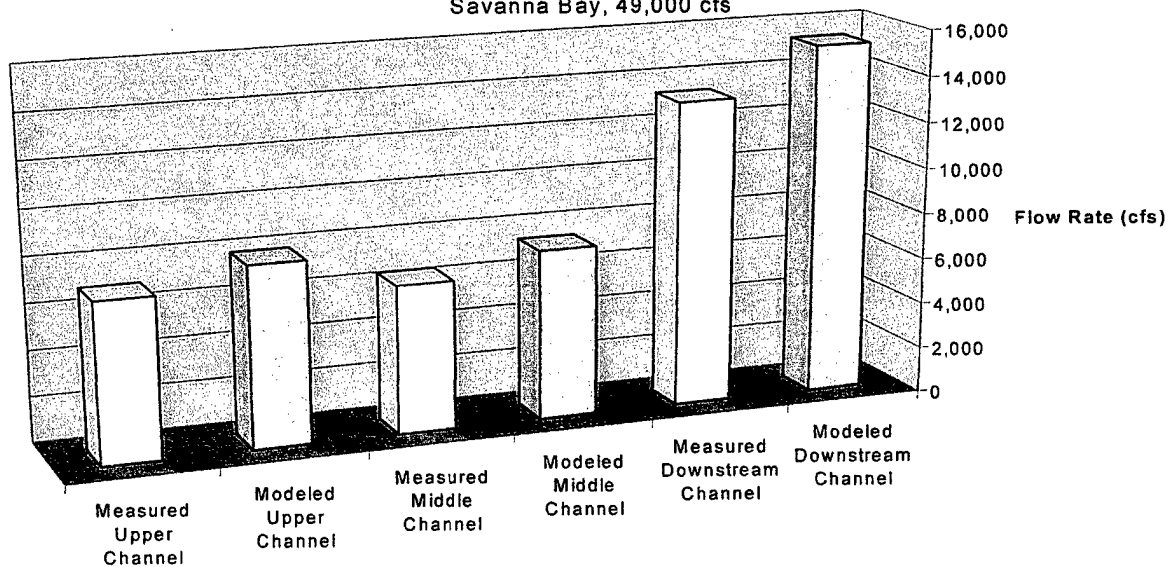
PLATE NO.

**37**

**Side Channel Openings**  
**Savanna Bay Flow Measurements vs. SMS Modeling Results**  
 Savanna Bay, 40,000 cfs



**Side Channel Openings**  
**Savanna Bay Flow Measurements vs. SMS Modeling Results**  
 Savanna Bay, 49,000 cfs



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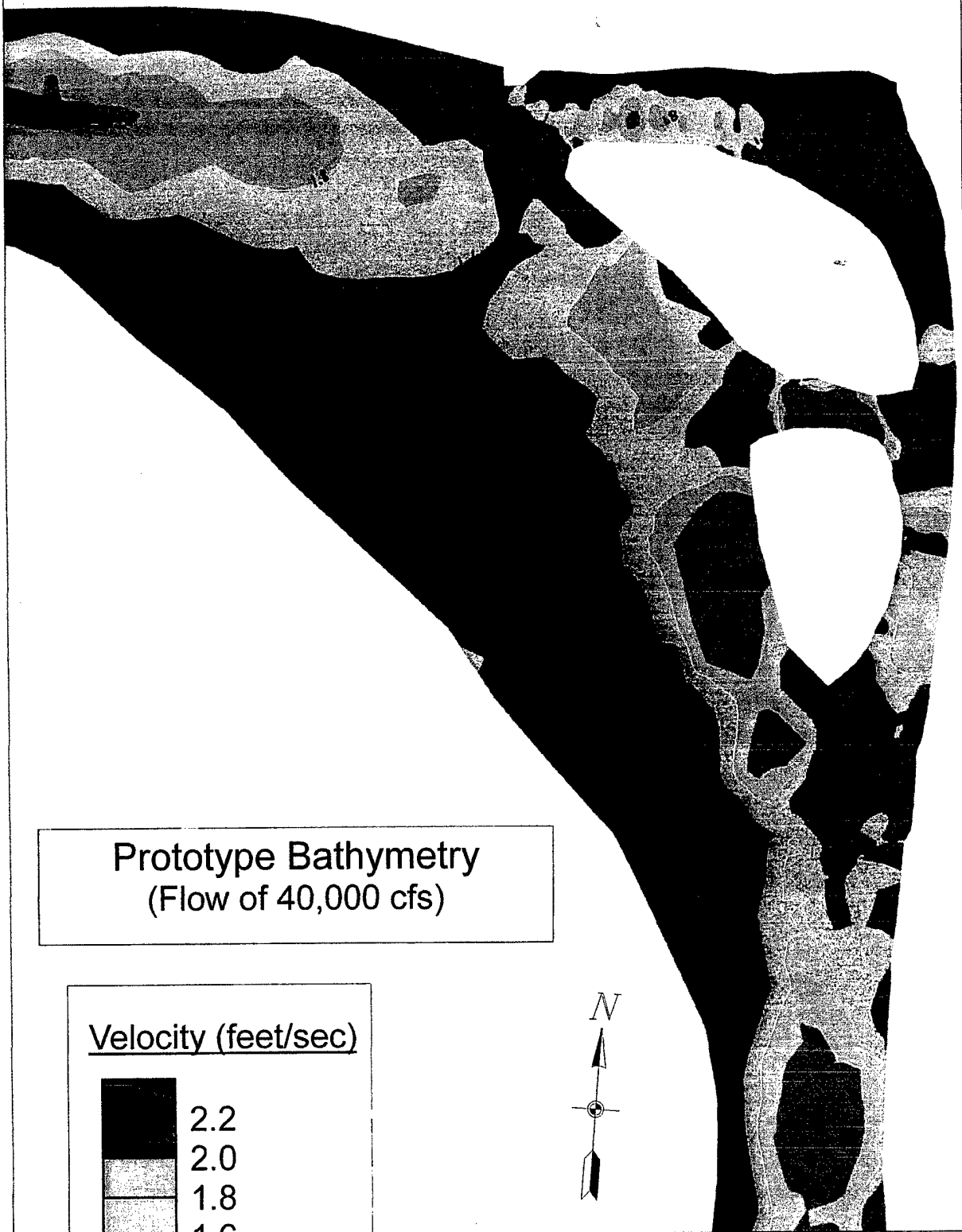
PREPARED BY: T. Kirkceng  
 CHECKED BY: R. Daviney

Navigation Improvement Study of the Upper Mississippi  
 River Near Savanna Bay, Pool 13

Side Channel Openings  
Measured Flow vs. SMS Modeling Results

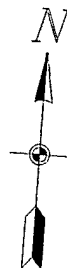
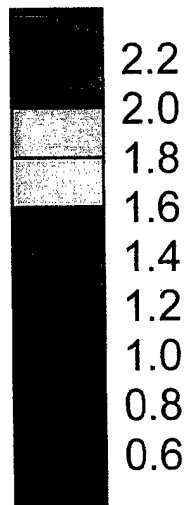
PLATE NO.

**38**



Prototype Bathymetry  
(Flow of 40,000 cfs)

Velocity (feet/sec)



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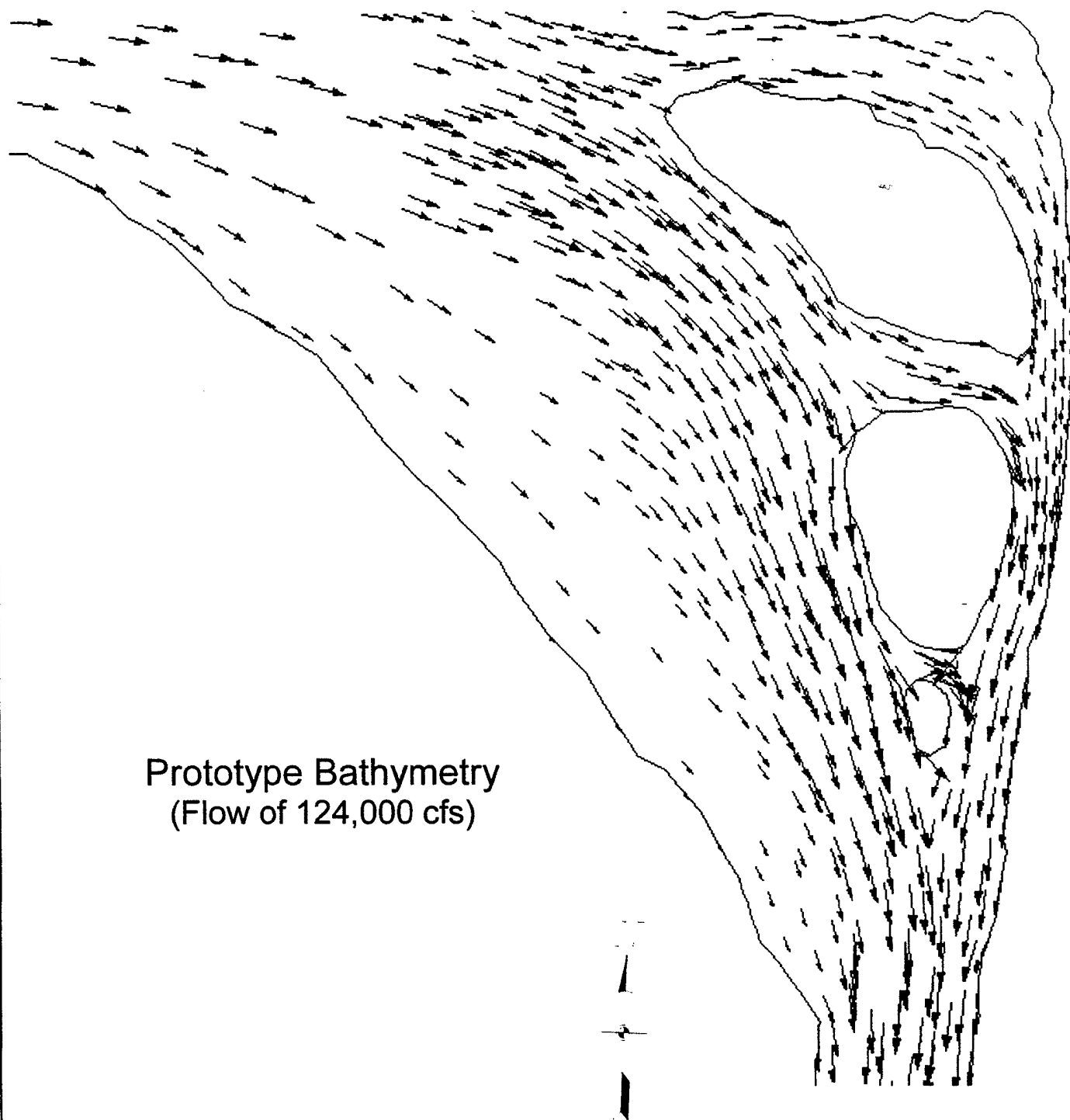
PREPARED BY: T. Kikeeng  
CHECKED BY: R. Deviney

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth Averaged Velocity Contours,  
SMS Model

PLATE NO.

**39**



Prototype Bathymetry  
(Flow of 124,000 cfs)

Vector Velocity Scale:



5 feet/sec



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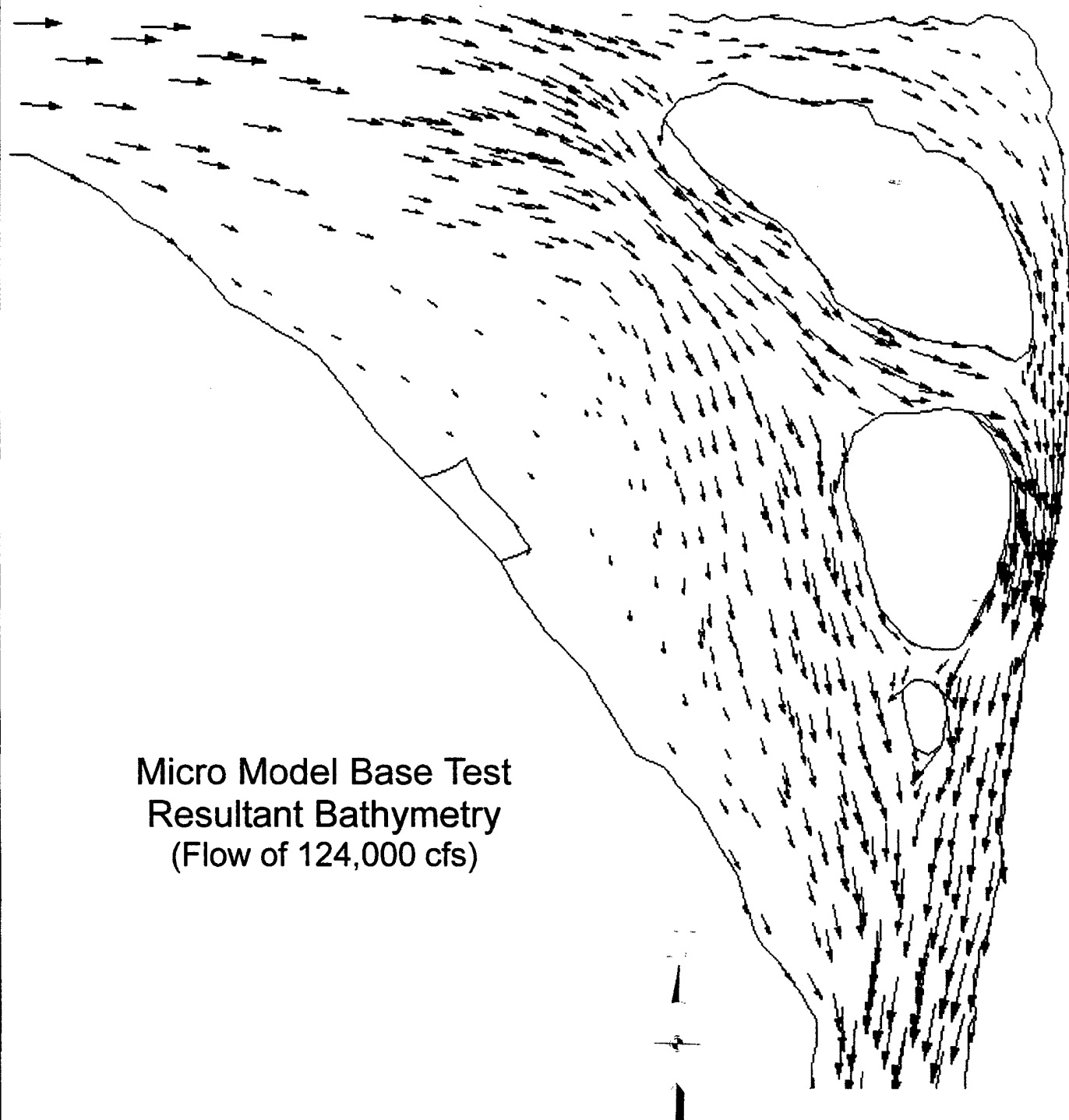
PREPARED BY: T. Kakeong  
CHECKED BY: R. Dawsey

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

**40**



Micro Model Base Test  
Resultant Bathymetry  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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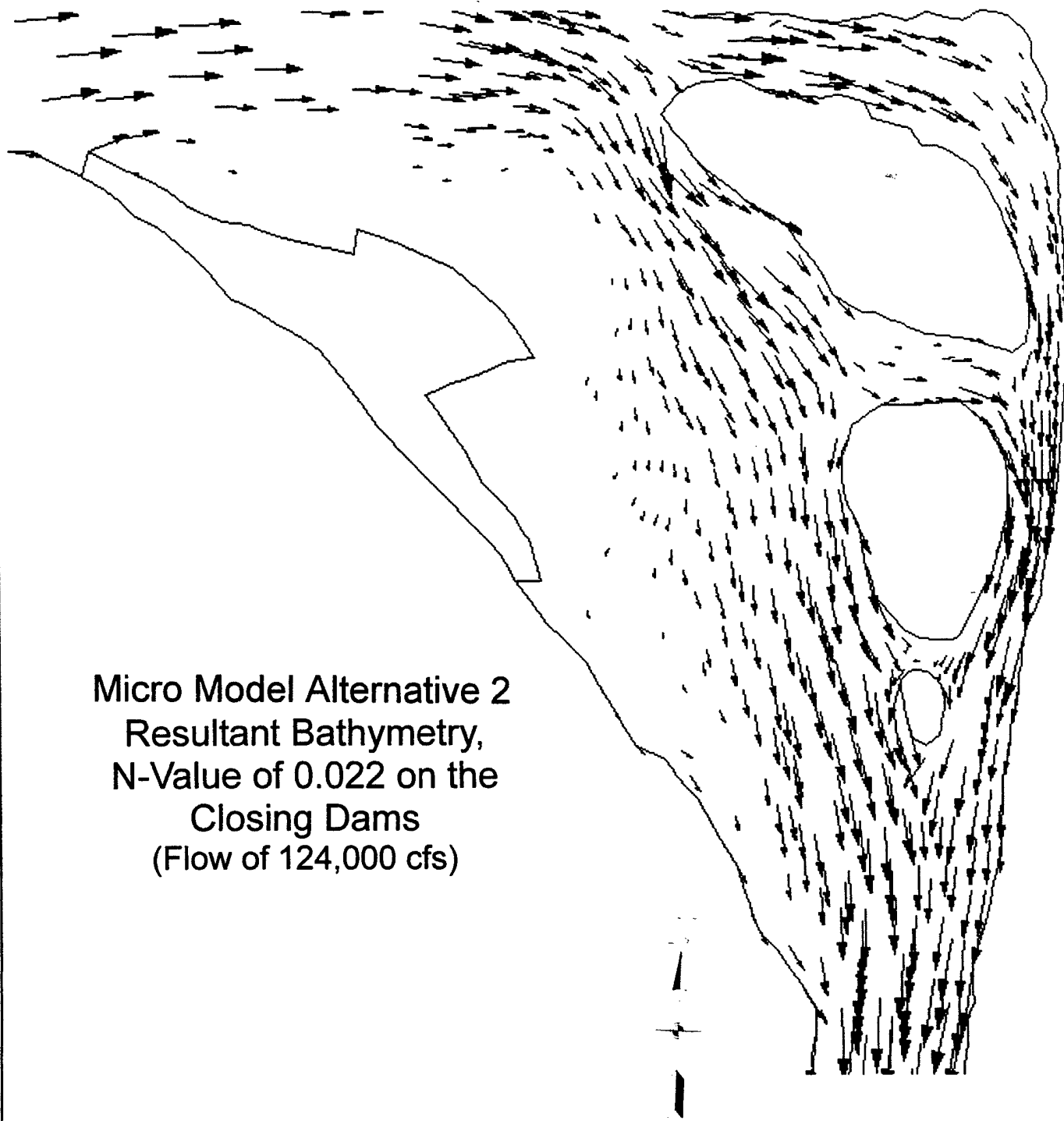
PREPARED BY: T. Kirseng  
CHECKED BY: R. Devenay

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

**41**



Micro Model Alternative 2  
Resultant Bathymetry,  
N-Value of 0.022 on the  
Closing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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PREPARED BY: T. Kulseng  
CHECKED BY: R. Dewdney

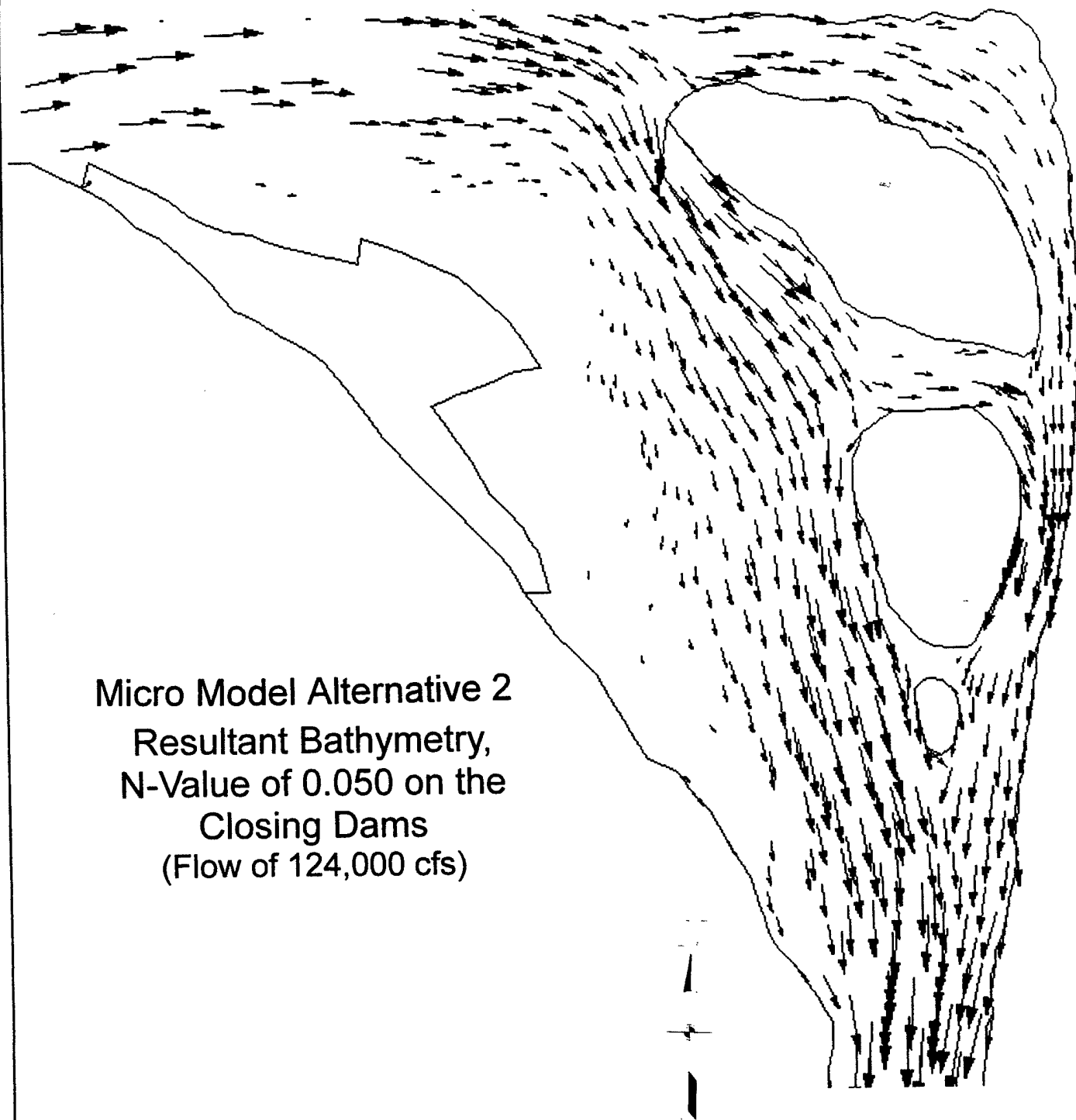
Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

42





Micro Model Alternative 2  
Resultant Bathymetry,  
N-Value of 0.050 on the  
Closing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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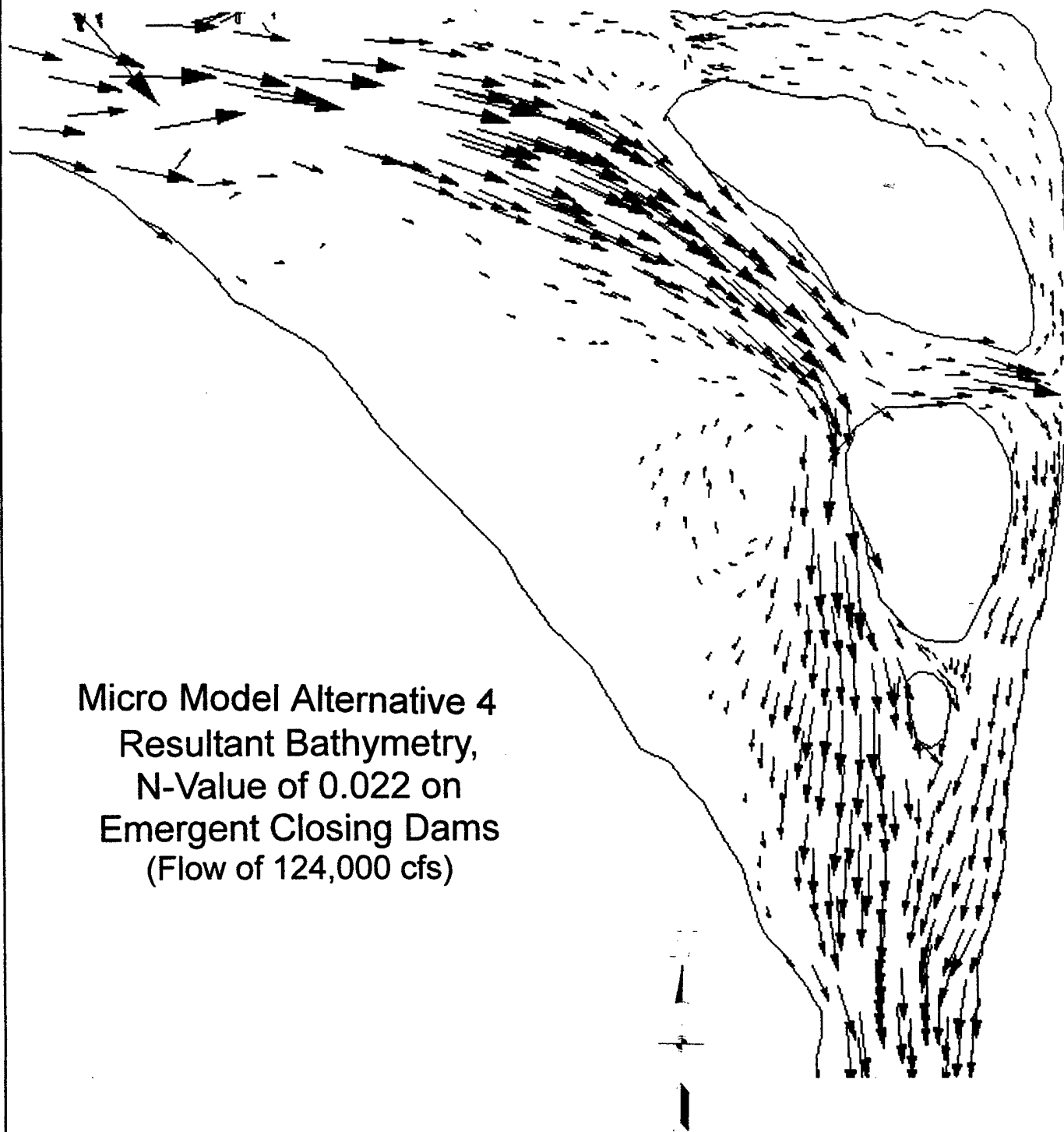
PREPARED BY: T. Krukeing  
CHECKED BY: R. Dewaroy

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

**43**



Micro Model Alternative 4  
Resultant Bathymetry,  
N-Value of 0.022 on  
Emergent Closing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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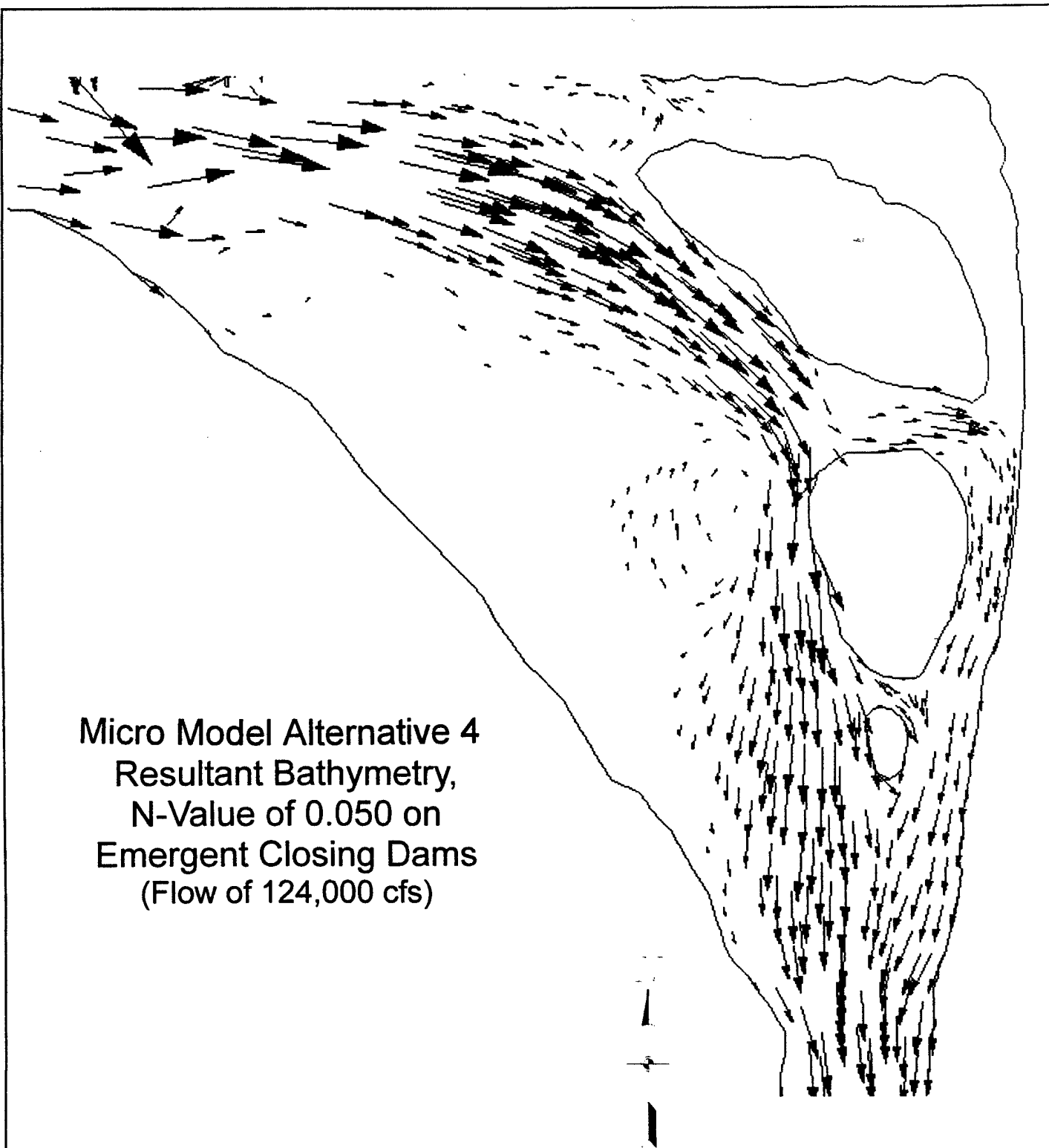
PREPARED BY: T. Kirsberg  
CHECKED BY: R. Devenney

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO.

**44**



Micro Model Alternative 4  
Resultant Bathymetry,  
N-Value of 0.050 on  
Emergent Closing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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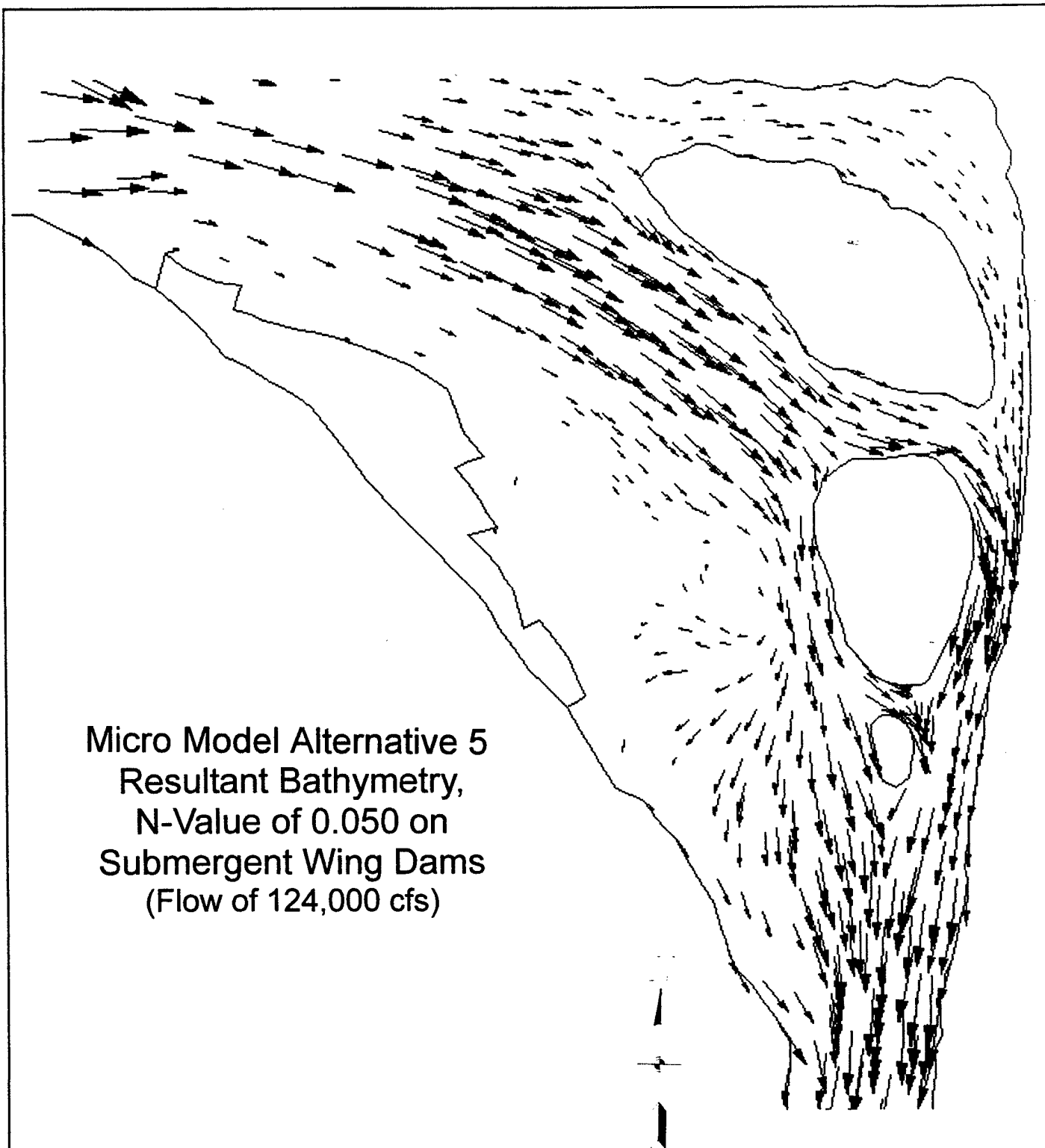
PREPARED BY: T. Kirskeing  
CHECKED BY: R. Dennyroy

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

45



Micro Model Alternative 5  
Resultant Bathymetry,  
N-Value of 0.050 on  
Submergent Wing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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CHECKED BY: R. Davenport

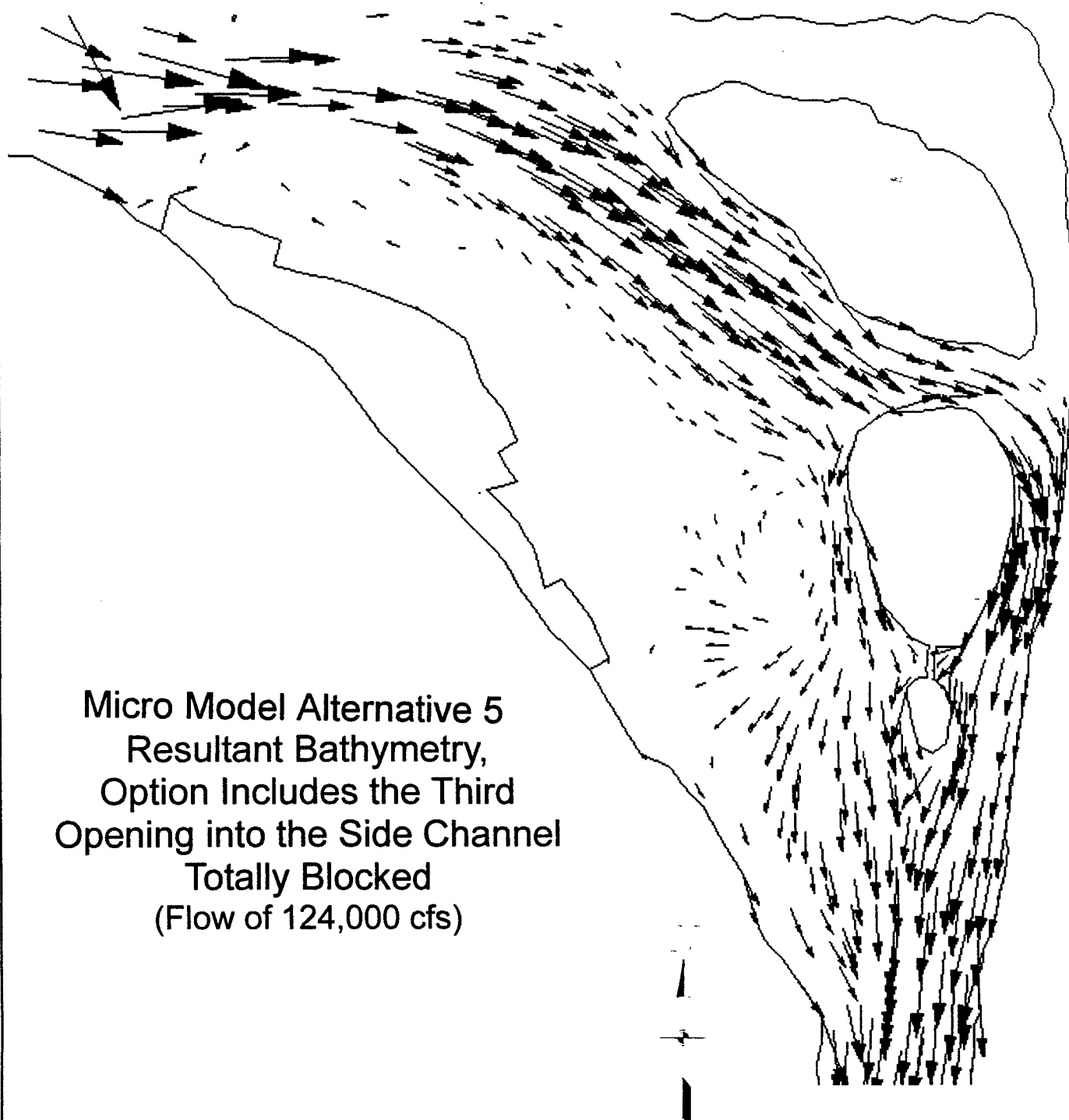
Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

46

Micro Model Alternative 5  
Resultant Bathymetry,  
Option Includes the Third  
Opening into the Side Channel  
Totally Blocked  
(Flow of 124,000 cfs)



Vector Velocity Scale:

→  
5 feet/sec



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ROCK ISLAND, ILLINOIS

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CHECKED BY: R. Dewdney

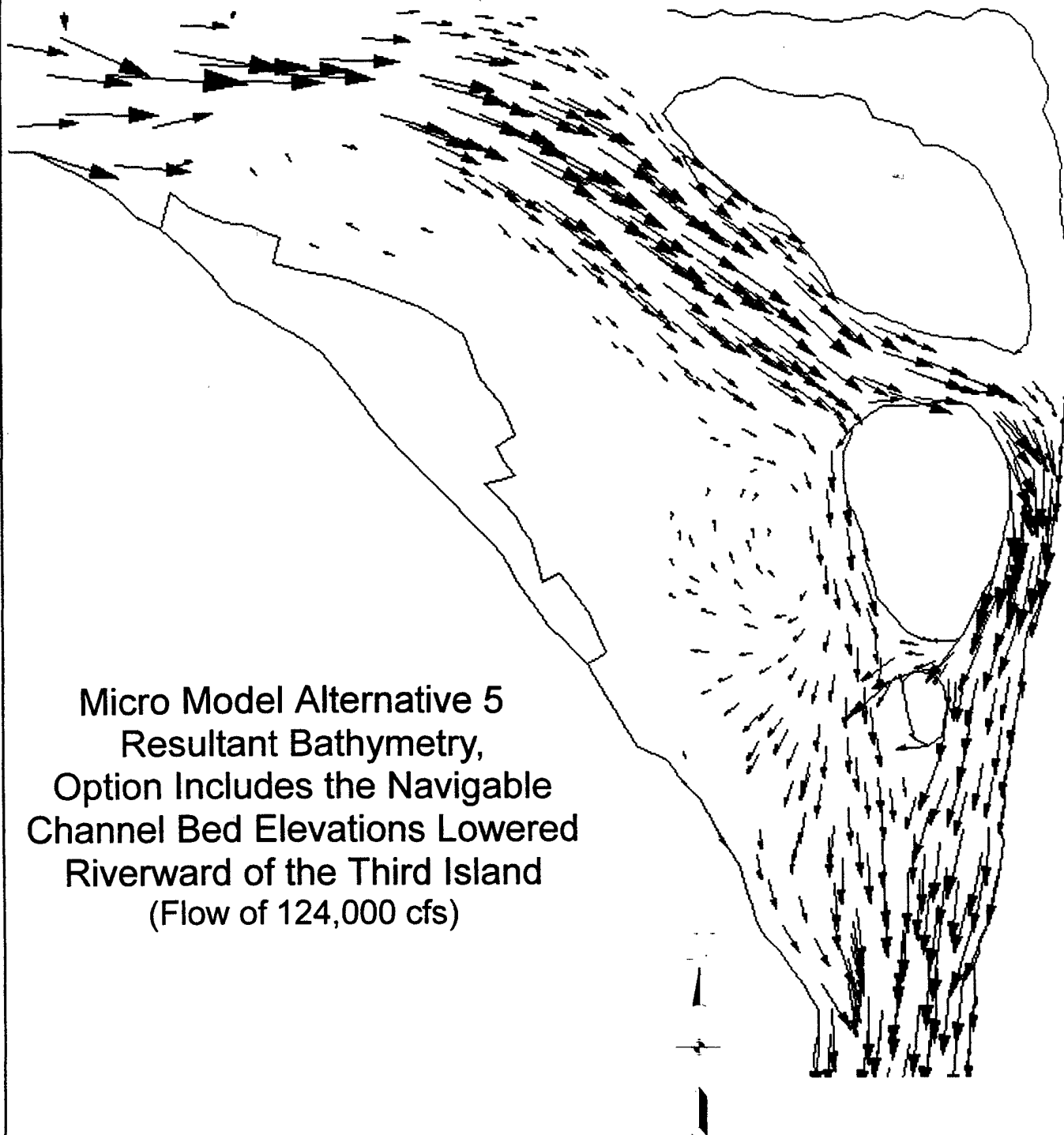
Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

47

Micro Model Alternative 5  
 Resultant Bathymetry,  
 Option Includes the Navigable  
 Channel Bed Elevations Lowered  
 Riverward of the Third Island  
 (Flow of 124,000 cfs)



Vector Velocity Scale:  
 →  
 5 feet/sec



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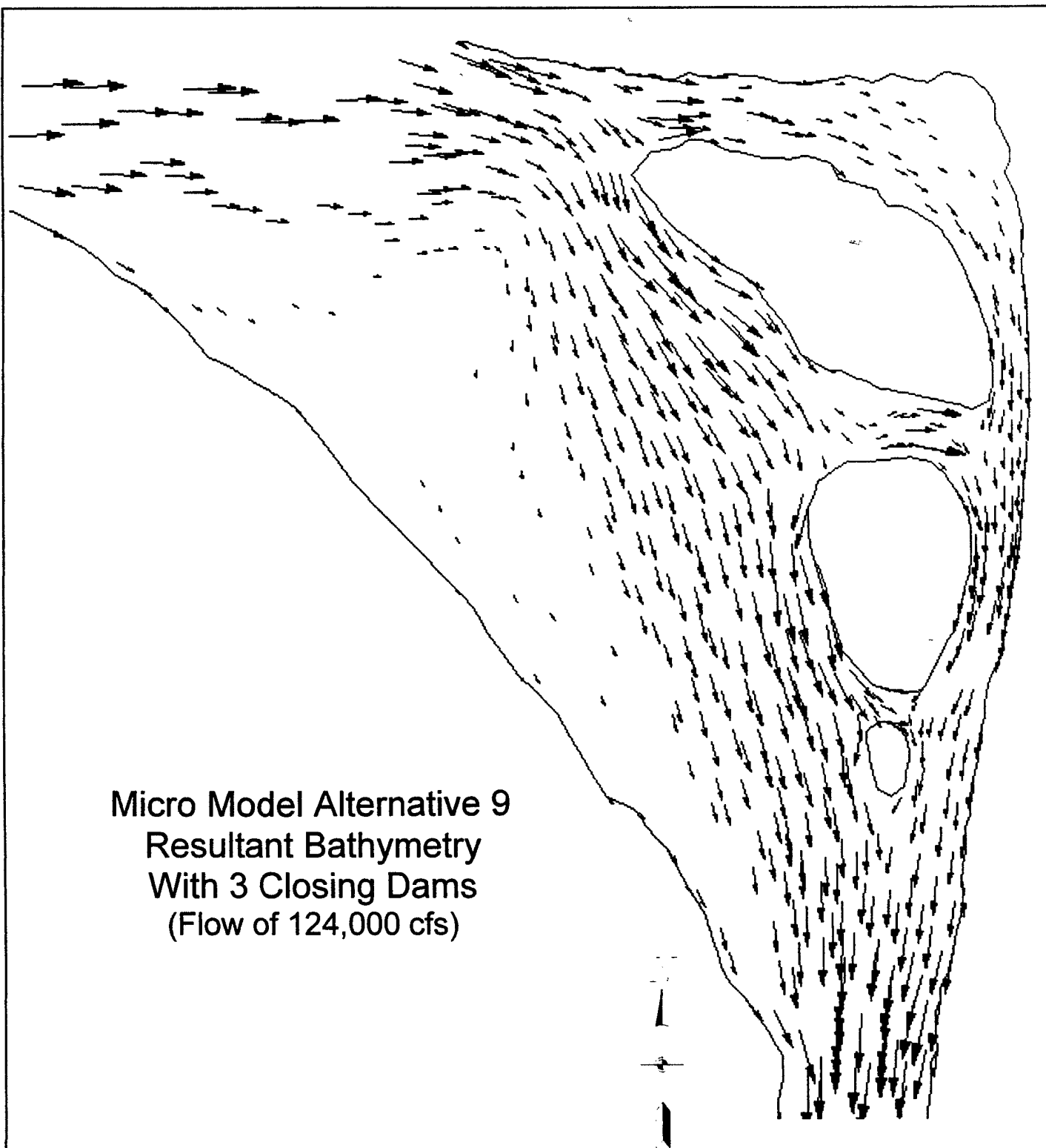
PREPARED BY: T. Krukeberg  
 CHECKED BY: R. Dewdney

Navigation Improvement Study of the Upper Mississippi  
 River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

48



Micro Model Alternative 9  
Resultant Bathymetry  
With 3 Closing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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ROCK ISLAND, ILLINOIS

PREPARED BY: T. Kirskaeng  
CHECKED BY: R. Deveroy

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO.

49